Pediatric Special Health Care Needs: Ventilators

I. All Provider Levels

1. Follow general patient care guidelines in section A1.

2. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

3. Assess the patient's airway and breathing including rate, auscultation, inspection, effort and adequacy of ventilation as indicated by chest rise.

    A. Follow the Tracheostomy protocol in section U1 to assess and manage the tracheostomy tube in addition to these protocols.

4. Look at the ventilator and determine the alarm code (i.e. heart rate, respiratory rate, apnea etc).

5. If no breathing is present, follow the steps below:

    A. Disconnect the ventilator tubing from the tracheostomy tube.

    B. Ask the caregivers to turn the ventilator off to prevent the alarm from sounding.

    C. Attach the bag-valve device to the opening of the tracheostomy tube and begin manual ventilation.
        i. If the tracheostomy has an inner cannula, it must be present in order to attach the bag-valve device.

    D. Assess for equal chest rise and breath sounds on both sides.

I. All Provider Levels (continued)

E. If chest rise is shallow, adjust the patient's airway position and check to see that the bag-valve device is securely connected to the tracheostomy tube.

i. If chest rise does not improve, assess the tracheostomy tube for obstructions by following the tracheostomy protocols.

6. Obtain a pulse oximeter reading.

7. Check pulse.

A. If no pulse is present, begin chest compressions and follow the appropriate algorithm.

> ***Note Well:*** *A ventilator will continue to provide breaths to a child who has no pulse.*

8. Assess circulation and perfusion.

9. Ask the caregivers for the child's baseline vital signs, ventilator settings, and if they are on home oxygen, the amount and method by which they receive the oxygen.

10. Obtain a complete history including a history of the present illness, past medical history and interventions taken to correct the emergency before EMS arrival.

Pediatric Special Health Care Needs: Ventilators

I. All Provider Levels (continued)

11. Ask the caregivers or assess the ventilator to determine if the machine is a ventilator, a BiPAP or CPAP machine.

> ***Note Well:*** BiPAP and CPAP are designed to assist or augment patient breathing and do not ventilate.

A. A child can be transported on CPAP and BiPAP providing his or her respiratory drive is not compromised.
   i. If the child has a poor or non-existent respiratory drive, manual ventilations must be initiated immediately.

> ***Note Well:*** *BiPAP and CPAP machines do not have internal batteries and only function if they are powered by a source of electricity.*

12. If bronchospasm is present in a patient with adequate ventilation, administer 2.5 mg albuterol via nebulizer over a 10-15 minute period by placing the aerosol mask directly over the tracheostomy tube.

A. If the patient is being assisted with ventilations, set up an in-line albuterol nebulizer treatment and administer directly through the tracheostomy tube.

B. Repeat Albuterol once if necessary at the same dose (for a total of 2 doses).

> *Note Well:* *ALS Providers may administer an additional 2.5 mg albuterol (for a total of 3 treatments) if bronchospasm continues.*

Pediatric Special Health Care Needs: Ventilators

I. All Provider Levels (continued)

13. If the child has respiratory distress or cardiac arrest, call for ALS support.

    A. Initiate care and do not delay transport waiting for an ALS unit.

14. If breathing is adequate, place the child in a position of comfort and administer 100% humidified oxygen.

> ***Note Well:*** *Insert 1 cc of normal saline into the tracheostomy tube every 15 minutes*

15. Check the ventilator and correct any ventilator problems per the following table:

Alarm	Possible causes	Interventions
Low Pressure / Apnea (results in inadequate ventilations or chest rise)	▪ Loose or disconnected circuit ▪ Leak in the circuit ▪ Leak around the tracheostomy site	▪ Ensure that all circuits are connected ▪ Check the tracheostomy balloon ▪ Ensure that the tracheostomy is well seated
Low Power	Internal battery is nearly depleted	Plug the ventilator into a power outlet
High Pressure	▪ Plugged or obstructed airway or circuit (secretions, water) ▪ Patient coughing or bronchospasm	▪ Clear obstruction ▪ Suction tracheostomy ▪ Administer bronchodilator (ALS Only)
Setting Error	Ventilator settings are not within equipment capacity (settings have been incorrectly adjusted)	▪ Manually ventilate the patient ▪ Transport the ventilator and patient
Power Switchover	The unit has switched from AC power to internal battery	Press the “Alarm silent” button after ensuring that the battery is powering the ventilator

16. If the child has excessive secretions, or receives humidified oxygen at home, insert 1 cc of normal saline into the tracheostomy tube every 15 minutes.

> ***Note Well:*** *Providers may alternatively provide humidification through an in-line normal saline nebulizer*

II. Advanced Life Support Providers

1. Initiate cardiac monitoring.

   A. Treat any arrhythmias with the appropriate algorithm.

III. Transport Decision

1. Contact medical control for additional instructions.

2. Bring any of the child's medical charts or medical forms that the caregiver may have, as well as any supplies that the parent may have for the tracheostomy tube.

> ***Note Well:*** *Some caregivers carry a "go bag" for their children with extra supplies. Ask the parent if they have a "go bag" or similar bag for their child and bring it to the hospital.*

3. Bring the ventilator, BiPAP or CPAP machine to the hospital.

   A. If the child is not experiencing respiratory distress, ensure that the ambulance can power the ventilator, or that the ventilator has adequate battery power.
      i. If power is not available, disconnect the child from the ventilator and manually ventilate the child.

III. Transport Decision (Continued)

4. Initiate transport to the nearest appropriate facility as soon as possible.

5. Perform focused history and detailed physical exam en route to the hospital.

6. Reassess at least every 3-5 minutes, more frequently as necessary and possible.

This protocol was developed and revised by Children's National Medical Center, Center for Prehospital Pediatrics, Division of Emergency Medicine and Trauma Services, Washington, D.C.